# ACTIVITY IN TEST DEVELOPMENT

Carson Y. Nolan

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As you may know, APH has for many years published tests of various kinds in braille and large type. Dr. Samuel Hayes, of Perkins School, was the person responsible for adaptation of most of these. Since his death, no one has filled this role and consequently the number of tests available has dwindled to three or less. In order to fill the need for such material, APH plans to assume a major role in the adaptation or development of tests for the blind.

We are currently working on several tests.

1. Roughness Discrimination Test - for predicting reading readiness for Braille.

Work on this test is almost complete. This test, which I described at length in Detroit two years ago consists of 69 items and takes about 12 minutes to administer. The task for the child is to identify one of four squares of sandpaper which are different from the others mounted on the same card. Last year this test was validated in this way. At the beginning of the school year the test was given to about 100 first graders. At the end of the year, this same group was given the braille form of the Gilmore Oral Reading Test. The correlation between the Roughness score and reading speed was found to be .55. The correlation between the Roughness Test score and reading errors was also .55. So, our test appears to have considerable validity. We are continuing our validation process this year and if our validity holds, we expect to have enough data to provide norms for this test. Then I believe the next step will be a limited release of the test for use in the field.

2. Last year I described our plans for publishing the new series of Stanford Achievement Tests in Braille and large type. I regret that because of problems experienced by Harcourt, Brace, and World, the originators of this series, this project will be delayed one year.

3. In recent months, considerable interest has been exhibited in adapting the School and College Ability Tests and the Sequential Tests of Educational Progress for use with visually handicapped children. Last Monday, I met with the publishers, Educational Testing Service, and this was discussed. It was found that it would be possible to put the School and College Ability Tests into braille and large type without difficulty. These tests appear in five levels for use with grades four through college sophomore. They are designed to provide measures of abilities which have been found to be most closely related to success in school learning. These include sentence understanding, numerical computation, word meanings, and numerical problem solving. We hope to have these materials available by the first of next year.

4. The second battery, the Sequential Tests of Educational progress, is a special kind of achievement test designed to measure the broad outcomes of general educations rather than the relatively narrow results of any specific subject matter course. This series also covers grades four through college sophomore. It includes tests of reading, writing, essay, social studies, mathematics, science, and one which I suspect will be extremely useful to use - listening.

These tests provide examples of most of the problems one encounters when attempting to adapt print tests to braille form. Tentative plans are now being made to use the adaptation of these tests as a general vehicle for the exploration of some of these problems.

For example, in some of the sections we must delete items because they appear in pictorial form in the print edition. This of course, immediately destroys any validity the sighted norms may have for the blind. We plan to study an approach to overcome this difficulty. A sample of about 400 sighted children will take the regular forms of the test and also a print version which will include only those test items that can be put into braille. By comparing one set of scores with the other, we hope to develop a constant that will enable us to indirectly use the sighted norms to evaluate scores on the shortened braille version of the test.

Many of the tests we use are called power tests. By this it is meant that they test ability to deal with material of varying difficulty and complexity, and that the speed with which this is done is not a factor in the test score. We build power tests by including a range of test items from very easy to very difficult. Difficulty of test items is expressed in terms of the proportion of a group that can answer the item correctly. If 80% of the group answer the item it is easy; if 20% of the group answer correctly, it is hard. We plan to explore the effects on item difficulty of changing tests from print to braille. In addition, we want to explore the effect on the difficulty of a pictorial item, when it is expressed in verbal form.

In addition to these tests, the American Printing House plans to adapt or develop several other tests within the next few years. These include a Braille group intelligence test, Braille Diagnostic Reading Test, and a Braille test of reading speed and comprehension

Perhaps you may be interested in hearing a few words about our research in mathematics. For several years we have been studying an adaptation of an arithmetic curriculum developed by Dr. A. F. Schott. This curriculum is based on the premise that the childs' learning experiences in the arithmetic classroom must be structured learning experiences which aid in the development of the abstractions, generalizations and conceptualizations basic to an understanding of arithmetic. To accomplish this aim, the curriculum is divided into five topics: counting, addition, multiplication, subtraction, and division. All of these topics are studied during each of the two semesters of the school year. This procedure is repeated for grades 1, 2, and 3. However, each time the five mathematical topics are repeated, the levels of complexity of each is increased. By the end of the third year or middle of

the fourth, all pupils will have studied and completed ordinal numbers, addition, multiplication, and powers of ten, subtraction and division and roots.

In addition to mathematics, the curriculum also emphasizes reading and vocabulary. The children learn to describe orally the operations of mathematics which enables individual children to lead the entire class through the solution of a problem involving any topic. In addition, children learn to write problems in complete mathematical and literal statements.

The structure of the curriculum allows for both group and individualized instruction. Each child can proceed at his own rate. A record keeping system identifies each child's point of achievement within the curriculum. This enables teachers to start each child at the point of learning appropriate at the start of each new year.

A form of abacus called the Numberaid is used as a primary teaching tool. Use of the Numberaid enables children to observe arithmetical operations in concrete terms and to express these through actual manipulation of the counters. This method takes arithmetic out of the abstract and expresses it in behavioral terms appropriate to the level of maturation of elementary school children. This tool is particularly important in the case of blind children since it allows numbers and arithmetical concepts to be expressed in a completely tactual manner. As children begin to attain mathematical proficiency, use of this tool diminishes, and common mental mathematical operations are substituted.

When Sam Ashcroft and I studied arithmetic computation some years ago, we found blind students to be about 20% retarded when compared with sighted norms. We have not completed testing the children in our experimental program for this year. However, for those that have been tested, we have found first and second graders, who started in the first grade in the program, obtaining a mean achievement score which is accelerated by four months. Third grades average right at grade level. However, these children have been in the program only two years.

This year we definitely identified a method for increasing Braille reading rates of students in grades 6 through 12. The usefulness of this method was demonstrated in an experiment conducted this spring, at the Illinois Braille and Sight Saving School.

Two groups of 15 students from grades 6-12 were matched on reading speed, reading comprehension, and grade level. One group was given one-half hour of reading training on 20 consecutive school days while the second group served as a control.

The training given the experimental group was of the reading pacing variety. Students were required to read materials which were exposed for progressively shorter and shorter time intervals. As the training pro-

ceeded, the difficulty of the practice material increased through short words to long words and short phrases to long phrases.

After the training period, both groups were retested with equivalent forms of the matching test. A second equivalent form was given thrity days after the first retest. On the initial retesting both groups were tested together and a monetary reward offered to the three persons from either group who most increased their speeds over those obtained in the matching tests.

The outcome was most gratifying. Our experimental group increased its reading speed by 25% and this increase in rate held at the second retest given thirty days after training stopped. Unfortunately, for the purity of our experiment, the control group also increased its reading speed by 25% and this increase still held 30 days later. Therefore teachers, if you want your Braille students to read faster, you simply have to pay them and they will do so.

Of course I am being facetious. What our experiment does demonstrate is something we have known for some time. That motivation is the key to the development of reading speeds, regardless of the medium. That by making reading an interesting task, by stimulating competition among and within individuals, by letting people know periodically how well they are doing, we can increase ability in this area.